

Design Patterns Lab

Problem:

The problem we are solving with this design is the implementation of boxes and then giving Santa the ability to give presents using boxes. Boxes have to hold things inside themselves and give us access to the things they hold. They can be wrapped for maximum gift giving and they can hold smaller boxes inside themselves for nested gift giving such as sending a box of individual presents to a group of people. Santa must also have a mechanism of giving gifts to people and it would also be good to provide a way for people to give gifts to each other.

Composite:

Our program used the composite pattern in the design of our Box and BigBox classes. Box is an interface that defines methods that all boxes should have. BigBox implements Box and has the ability to hold objects, including multiple boxes, within itself. It uses the composite pattern because now a Box that is a BigBox can hold Boxes inside itself including other BigBoxes. Boxes need to be able to hold anything inside themselves and a BigBox is a basic, bare bones implementation of it that with no additional or special parts.

Strategy:

The Strategy design pattern can be seen through the GiftGiver interface. GiftGiver has a method "givePresent", which returns a Box. In our example, the "Santa" class implements GiftGiver. Santa has as a instance variable of "XmasSack", which contains an ArrayList of Box objects. The Santa class implements the "givePresent" method from "GiftGiver" by getting the first present out of the XmasSack. Another potential "GiftGiver" could be a Friend or Grandma. Those people would be unlikely to have a XmasSack of presents, but would still have gifts to give.

Decorator:

Our "WrappedBox" class is an example of the Decorator design pattern. WrappedBox implements Box, but also contains a Box object, as well as a boolean indicating whether it is wrapped or not, and any additional contents. This allows us to put an undecorated Box inside of a WrappedBox, and also include other things inside the WrappedBox (like tissuepaper, or a card).